PATENT
Attorney's Docket No. **RIC02009**

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

In re Patent Application of:	)	**Mail Stop APPEAL BRIEF - PATENTS**
	)	
Nandagopal VENUGOPAL et al.	)	Group Art Unit: 2477
	)	
Application No.: 10/797,029	)	Examiner: S. Kang
	)	
Filed: March 11, 2004	)	
	)	
For: APPARATUS AND METHOD FOR DESIGNING RING COVERS	)	

U.S. Patent and Trademark Office
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APPEAL BRIEF

This Appeal Brief is submitted in response to the final Office Action, dated April 13, 2010, and in support of the Notice of Appeal filed July 12, 2010.

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I. REAL PARTY IN INTEREST

The real party in interest of the present application, solely for purposes of identifying and avoiding potential conflicts of interest by board members due to working in matters in which the member has a financial interest, is Verizon Communications Inc. and its subsidiary companies, which currently include Verizon Business Global, LLC (formerly MCI, LLC) and Cellco Partnership (doing business as Verizon Wireless, and which includes as a minority partner affiliates of Vodafone Group Plc). Verizon Communications Inc. or one of its subsidiary companies is an assignee of record of the present application.

II. RELATED APPEALS, INTERFERENCES, AND JUDICIAL PROCEEDINGS

Appellants are unaware of any related appeals, interferences, or judicial proceedings.

III. STATUS OF CLAIMS

Claims 1-13, 16-19, and 21-30 are pending in this application. Claims 14, 15, and 20 have been canceled without prejudice or disclaimer. Claims 1-13, 16-19, and 21-30 were rejected in the final Office Action, dated April 13, 2010, and are the subject of the present appeal. These claims are reproduced in the Claim Appendix of this Appeal Brief.

IV. STATUS OF AMENDMENTS

No Amendment was filed following the final Office Action, dated April 13, 2010. A Request for Reconsideration, however, was filed on June 4, 2010. A subsequent Advisory Action, dated June 29, 2010, indicated that the Request for Reconsideration has been considered, but does not place the application in condition for allowance.

V. SUMMARY OF CLAIMED SUBJECT MATTER

The following summary of the presently claimed subject matter indicates certain portions of the specification (including the drawings) that provide examples of embodiments of elements of the claimed subject matter. It is to be understood that other portions of the specification not cited herein may also provide examples of embodiments of elements of the claimed subject matter. It is also to be understood that the indicated examples are merely examples, and the scope of the claimed subject matter includes alternative embodiments and equivalents thereof. References herein to the specification are thus intended to be exemplary and not limiting.

Claim 1 recites: A processor-implemented method comprising: receiving, at the processor, network configuration information and traffic demand information for a network (e.g., 502, Fig. 5; paragraph 0053); generating, by the processor, a plurality of ring cover candidates, each ring cover candidate including a plurality of rings, based on the network configuration information and the traffic demand information, each of the rings including a plurality of network spans, where the generating the ring cover candidate includes generating the plurality of ring cover candidates by using a different process to generate each of the ring cover candidates (e.g., 516, Fig. 5; paragraphs 0066-0067); counting, for each ring cover candidate of the plurality of ring cover candidates, a number of loaded network spans covered by the ring cover candidate (e.g., 1506, Fig. 15; paragraph 0075); and selecting one of the plurality of ring cover candidates as a recommended ring cover candidate by selecting the one of the ring cover candidates having a highest number of loaded network spans (e.g., 1402, Fig. 4; paragraph 0074).

Claim 16 recites: An apparatus comprising: at least one storage device to store instructions (e.g., 350, Fig. 3; paragraph 0048); and at least one processor (e.g., 320, Fig. 3;

paragraph 0049) to execute the instructions to: generate a plurality of ring cover candidates based on configuration information and traffic demand information associated with a network, where the at least one processor generates the plurality of ring cover candidates using a different set of parameters to generate each of the ring cover candidates (e.g., paragraph 0053), count, for each ring cover candidate of the plurality of ring cover candidates, a number of loaded network spans covered by the ring cover candidate (e.g., paragraph 0075), and select one of the plurality of ring cover candidates as a recommended ring cover candidate by selecting the one of the ring cover candidates having a highest number of loaded network spans (e.g., paragraph 0074).

Claim 23 recites: A system comprising: means for receiving network configuration information and information representing predicted traffic demand for a network (e.g., 202, Fig. 2; paragraph 0053); means for generating a plurality of ring cover candidates using a different process to generate each of the ring cover candidates, based on the network configuration information and the information representing predicted traffic demand, each of the ring cover candidates including a plurality of rings, and each of the rings including a plurality of network spans (e.g., 202, Fig. 2; paragraphs 0066-0067); means for counting, for each ring cover candidate of the plurality of ring cover candidates, a number of loaded network spans covered by the ring cover candidate (e.g., 202, Fig. 2; paragraph 0075); and means for selecting one of the ring cover candidates as a recommended ring cover candidate, the recommended ring cover candidate having a highest number of loaded network spans (e.g., 202, Fig. 2; paragraph 0074).

Claim 24 recites: A hardware memory device having recorded thereon instructions for at least one processor, the instructions comprising instructions for the at least one processor to perform a method, the method comprising: generating a plurality of ring cover candidates for a

network by using a different procedure to select a respective plurality of rings for each of the ring cover candidates, the generation of the ring cover candidates being based on configuration information and information representing predicted traffic demand associated with the network, each of the rings including a plurality of network spans (e.g., 502, Fig. 5; paragraph 0053); counting, for each ring cover candidate of the plurality of ring cover candidates, a number of loaded network spans covered by the ring cover candidate (e.g., 1506, Fig. 15; paragraph 0075); and selecting one of the ring cover candidates as a recommended ring cover candidate, the recommended ring cover candidate having a highest number of loaded network spans (e.g., 1402, Fig. 4; paragraph 0074).

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

A. Claims 1, 3, 16, 19, 22-25, and 29 have been rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over GARDNER ("Techniques for Finding Ring Covers in Survivable Networks," Proceedings on IEEE GLOBECOM; 1994; hereinafter GARDNER) in view of GROVER (U.S. Patent No. 6,819,662; hereinafter GROVER).

B. Claims 2, 9-13, 17, and 30 have been rejected under 35 U.S.C. § 103(a) as unpatentable over GARDNER in view of GROVER and CHOW (U.S. Patent No. 7,133,410; hereinafter CHOW).

C. Claims 4-8, 18, 21, and 26-28 have been rejected under 35 U.S.C. § 103(a) as unpatentable over GARDNER in view of GROVER and KENNINGTON ("Optimization Based Algorithms for Finding Minimal Cost Ring Covers in Survivable Networks, "*Computational Optimization and Applications, 14*; 1999; hereinafter KENNINGTON).

VII. ARGUMENTS

A. The rejection under 103(a) based on GARDNER and GROVER should be reversed.

The initial burden of establishing a *prima facie* basis to deny patentability to a claimed invention always rests upon the Examiner. In re Oetiker, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In rejecting a claim under 35 U.S.C. § 103, the Examiner must provide a factual basis to support the conclusion of obviousness. In re Warner, 379 F.2d 1011, 154 U.S.P.Q. 173 (CCPA 1967). Based upon the objective evidence of record, the Examiner is required to make the factual inquiries mandated by Graham v. John Deere Co., 86 S.Ct. 684, 383 U.S. 1, 148 U.S.P.Q. 459 (1966). KSR International Co. v. Teleflex Inc., 550 U.S. 398 (April 30, 2007). The Examiner is also required to explain how and why one having ordinary skill in the art would have been realistically motivated to modify an applied reference and/or combine applied references to arrive at the claimed invention. Uniroyal, Inc. v. Rudkin-Wiley Corp., 837 F.2d 1044, 5 U.S.P.Q.2d 1434 (Fed. Cir. 1988).

1. Claims 1 and 3

Independent claim 1 recites a processor-implemented method for designing a ring cover candidate for a network. The method includes receiving, at the processor, network configuration information and traffic demand information for the network; generating, by the processor, a plurality of ring cover candidates, each ring cover candidate including a plurality of rings, based on the network configuration information and the traffic demand information, each of the rings including a plurality of network spans, where the generating the ring cover candidate includes generating the plurality of ring cover candidates by using a different process to generate each of the ring cover candidates; counting, for each ring cover candidate of the plurality of ring cover candidates, a number of loaded network spans covered by the ring cover candidate; and selecting

one of the plurality of ring cover candidates as a recommended ring cover candidate by selecting the one of the ring cover candidates having a highest number of loaded network spans. GARDNER and GROVER, whether taken alone or in any reasonable combination, do not disclose or suggest one or more of these features.

For example, GARDNER and GROVER do not disclose or suggest selecting one of a plurality of ring cover candidates as a recommended ring cover candidate by selecting the one of the ring cover candidates having a highest number of loaded network spans, as recited in claim 1. The Examiner admits that GARDNER does not disclose this feature and relies on the abstract; column 10, lines 24-38; column 29, lines 37-38 and 51-59; and column 32, lines 12-15 and 35-39 of GROVER as allegedly disclosing this feature of claim 1 (final Office Action, pp. 3-4). Appellants submit that neither these sections, nor any other sections, of GROVER disclose or suggest the above feature of claim 1. As such, a *prima facie* case of obviousness has not been established with regard to claim 1.

In the abstract, GROVER discloses:

> A method of connecting a telecommunications network, in which the network is formed of plural nodes connected by plural spans. Each node has a nodal switching device for making connections between adjacent spans meeting at the node. Method steps A-F are followed. A) Select a set of candidate rings, each candidate ring being formed of nodes connected by spans, the candidate rings each being capable of serving a number of demands and having a ring construction cost C. B) Assess the total transport utility U of each candidate ring, wherein the total transport utility is a measure of at least the number of demands served by the respective candidate ring. C) Assess the construction cost of each candidate ring. D) Calculate a ratio formed of U/C for each candidate ring. E) Choose, from the set of candidate rings, a best set of candidate rings, wherein candidate rings in the best set of candidate rings have a higher ratio of U/C than candidate rings not in the best set. F) Forming rings in the network that are selected from the best set of candidate simple rings.

This section of GROVER discloses choosing a best set of candidate rings based on the ratio of total transport utility (U) to ring construction cost (C) for each candidate ring. This section of

GROVER does not disclose selecting a ring cover candidate <u>based on a number of loaded network spans</u>. A ratio of a total transport utility to ring construction cost, as disclosed by GROVER, is simply a different concept from a number of loaded network spans, as recited in claim 1. In fact, this section of GROVER does not disclose loaded network spans at all. Therefore, this section of GROVER does not disclose or suggest selecting one of a plurality of ring cover candidates as a recommended ring cover candidate by selecting the one of the ring cover candidates having a highest number of loaded network spans, as recited in claim 1.

At column 10, lines 24-38, GROVER discloses:

> More specifically, a simple demand route sorting method orders, by decreasing cycle involvement, the demand routes that have at least one demand route segment in common with the cycle being loaded. Cycle involvement is defined as the bandwidth distance product of the not-yet-loaded demand route segments which intersect with the cycle's trajectory. The main premise of this rule is the hypothesis that the longer a large demand route is carried on a cycle, the better suited the demand route is for inclusion in the ring candidate formed from the cycle being loaded. The more of the `well-suited` demand routes a ring candidate can carry, the better utilized and hence more efficient the resulting ring candidate will be. This rule was developed as a simplification of the complex demand route sorting strategy presented next.

This section of GROVER discloses that the more of the `well-suited` demand routes a ring candidate can carry, the better utilized and, hence, more efficient the resulting ring candidate will be. This section of GROVER further discloses that the longer a large demand route is carried on a cycle, the better suited the demand route is for inclusion in the ring candidate formed from the cycle being loaded. This section of GROVER does not disclose <u>selecting a ring cover candidate</u> based on a number of loaded network spans. Rather, this section of GROVER discloses <u>selecting a demand route</u> for inclusion in the ring candidate. Selecting a ring cover candidate, as recited in claim 1 is simply a different concept from selecting a demand route for inclusion in a ring candidate, as disclosed by GROVER. Therefore, this section of GROVER does not disclose

or suggest selecting one of a plurality of ring cover candidates as a recommended ring cover candidate by selecting the one of the ring cover candidates having a highest number of loaded network spans, as recited in claim 1.

At column 29, lines 34-38, GROVER discloses that cycle related statistics include transition count, balance transition count, add/drop count, links on count, and ADM count and that span-related statistics include remaining bandwidth, links on count, and route count. This section of GROVER has nothing to do with selecting a ring cover candidate. Rather, this section of GROVER merely outlines statistics related to cycles and spans. Therefore, this section of GROVER does not disclose or suggest selecting one of a plurality of ring cover candidates as a recommended ring cover candidate by selecting the one of the ring cover candidates having a highest number of loaded network spans, as recited in claim 1.

At column 29, lines 55-67, GROVER discloses:

> FIG. 21 shows the relationships between the 4 main data entities that. RingBuilder.TM. operates on. In the context of a network, RingBuilder.TM. loads segments of routed demands (routes) 158 onto each cycle 156, forming a loaded cycles 164 for each cycle 156. The loading heuristic attempts to pick the best possible set of demand segments in order to make the loaded cycle 164 as appealing as possible to the cycle evaluator. The cycle evaluator chooses the best loaded cycle, and that cycle becomes a ring in the network design.

This section of GROVER discloses that the loaded heuristic attempts to pick the best possible set of demand segments in order to make a loaded cycle as appealing as possible to a cycle evaluator. This section of GROVER further discloses that the cycle evaluator chooses the best loaded cycle, and that cycle becomes a ring in the network design. This section of GROVER does not disclose that the best loaded cycle includes having a highest number of loaded network spans. In fact, as noted above, GROVER discloses choosing a best set of candidate rings based on the ratio of total transport utility (U) to ring construction cost (C) for each candidate ring

(abstract), which is simply a different concept from the above feature of claim 1. Therefore, this section of GROVER does not disclose or suggest selecting one of a plurality of ring cover candidates as a recommended ring cover candidate by selecting the one of the ring cover candidates having a highest number of loaded network spans, as recited in claim 1.

At column 32, lines 12-15, GROVER discloses that, once all of the cycles have been evaluated, the best cycle found is committed as a ring in the design in the Commit Ring module, which updates the persistent route data structure and also the span2Route data structure. This section of GROVER does not disclose selecting a ring cover candidate based on a number of loaded network spans. In fact, this section of GROVER does not disclose loaded network spans at all. Therefore, this section of GROVER does not disclose or suggest selecting one of a plurality of ring cover candidates as a recommended ring cover candidate by selecting the one of the ring cover candidates having a highest number of loaded network spans, as recited in claim 1.

At column 32, lines 35-39, GROVER discloses that the getRoutes function creates a list of routes for a cycle being loaded by obtaining a list of spans comprising the cycle and then, for each cycle span, obtaining from the route list the set of routes crossing the span. This section of GROVER discloses <u>creating a list of routes</u> for a cycle being loaded and does not disclose or suggest <u>selecting a ring cover candidate</u>. Therefore, this section of GROVER does not disclose or suggest selecting one of a plurality of ring cover candidates as a recommended ring cover candidate by selecting the one of the ring cover candidates having a highest number of loaded network spans, as recited in claim 1.

Further with regard to claim 1, the Examiner alleges that GROVER discloses "determining the number of loaded spans covered by the ring candidate…Grover goes on to

further suggest that the more demand routes a ring candidate can carry, the better utilized and hence more efficient the resulting ring candidate will be…Thus in determining the best ring candidate to select, Grover suggests the system should consider choosing the ring candidate with the highest number of demand routes" (final Office Action, pg. 16). Appellants submit that the Examiner's allegation regarding GROVER is inconsistent with the disclosure of GROVER.

As noted above, GROVER discloses that the more of the `well-suited` demand routes a ring candidate can carry, the better utilized and hence more efficient the resulting ring candidate will be (column 10, lines 24-38). GROVER further discloses choosing a best set of candidate rings based on the ratio of total transport utility (U) to ring construction cost (C) for each candidate ring (abstract). GROVER in no way discloses or suggests that a ring candidate with the highest number of demand routes is the same as the ring cover candidate having a highest number of loaded network spans, as recited in claim 1.

Furthermore, even if a ring candidate with the highest number of demand routes could reasonably be construed as corresponding to the ring cover candidate having a highest number of loaded network spans (a point with Appellants do not agree), GROVER does not disclose or suggest selecting one of a plurality of ring cover candidates as a recommended ring cover candidate by selecting the one of the ring cover candidates having a highest number of demand routes, as would be required by GROVER based on the Examiner's interpretation of claim 1. Rather, GROVER specifically discloses choosing candidate rings based on <u>the ratio of total transport utility (U) to ring construction cost (C) for each candidate ring</u>. As discussed above, this ratio is simply a different concept from a number of loaded network spans. Therefore, GROVER does not disclose or suggest selecting one of a plurality of ring cover candidates as a

recommended ring cover candidate by selecting the one of the ring cover candidates having a highest number of loaded network spans, as recited in claim 1.

For at least the foregoing reasons, Appellants submit that the rejection of claim 1 under 103(a) based on GARDNER and GROVER is improper. As such, Appellants respectfully request that the rejection of claim 1 be reversed.

Claim 3 depends from claim 1. As such, Appellants request that the rejection of claim 3 be reversed for at least the reasons given above with respect to claim 1.

2. Claims 16, 19, and 22

Independent claim 16 recites an apparatus that includes at least one storage device to store instructions; and at least one processor to execute the instructions to: generate a plurality of ring cover candidates based on configuration information and traffic demand information associated with a network, where the at least one processor generates the plurality of ring cover candidates using a different set of parameters to generate each of the ring cover candidates, count, for each ring cover candidate of the plurality of ring cover candidates, a number of loaded network spans covered by the ring cover candidate, and select one of the plurality of ring cover candidates as a recommended ring cover candidate by selecting the one of the ring cover candidates having a highest number of loaded network spans. GARDNER and GROVER, whether taken alone or in any reasonable combination, do not disclose or suggest one or more of these features.

For example, GARDNER and GROVER do not disclose or suggest a processor to execute instructions to select one of a plurality of ring cover candidates as a recommended ring cover candidate by selecting the one of the ring cover candidates having a highest number of

loaded network spans, as recited in claim 16. The Examiner admits that GARDNER does not disclose this feature and relies on the abstract; column 10, lines 24-38; column 29, lines 37-38 and 51-59; and column 32, lines 12-15 and 35-39 of GROVER as allegedly disclosing this feature of claim 16 (final Office Action, pp. 3-4). Appellants submit that neither these sections, nor any other sections, of GROVER disclose or suggest the above feature of claim 16. As such, a *prima facie* case of obviousness has not been established with regard to claim 16.

As noted above, in the abstract, GROVER discloses choosing a best set of candidate rings based on the ratio of total transport utility (U) to ring construction cost (C) for each candidate ring. This section of GROVER does not disclose selecting a ring cover candidate based on a <u>number of loaded network spans</u>. A ratio of a total transport utility to ring construction cost, as disclosed by GROVER, is simply a different concept from a number of loaded network spans. In fact, this section of GROVER does not disclose loaded network spans at all. Therefore, this section of GROVER does not disclose or suggest a processor to execute instructions to select one of a plurality of ring cover candidates as a recommended ring cover candidate by selecting the one of the ring cover candidates having a highest number of loaded network spans, as recited in claim 16.

As noted above, at column 10, lines 24-38, GROVER discloses that the more of the `well-suited` demand routes a ring candidate can carry, the better utilized and hence more efficient the resulting ring candidate will be. This section of GROVER further discloses that the longer a large demand route is carried on a cycle, the better suited the demand route is for inclusion in the ring candidate formed from the cycle being loaded. This section of GROVER does not disclose <u>selecting a ring cover candidate</u> based on a number of loaded network spans.

Rather, this section of GROVER discloses selecting a demand route for inclusion in the ring candidate. Selecting a ring cover candidate, as recited in claim 16 is simply a different concept from selecting a demand route for inclusion in a ring candidate, as disclosed by GROVER. Therefore, this section of GROVER does not disclose or suggest a processor to execute instructions to select one of a plurality of ring cover candidates as a recommended ring cover candidate by selecting the one of the ring cover candidates having a highest number of loaded network spans, as recited in claim 16.

As noted above, at column 29, lines 34-38, GROVER discloses that cycle related statistics include transition count, balance transition count, add/drop count, links on count, and ADM count and that span-related statistics include remaining bandwidth, links on count, and route count. This section of GROVER has nothing to do with selecting a ring cover candidate. Rather, this section of GROVER merely outlines statistics related to cycles and spans. Therefore, this section of GROVER does not disclose or suggest a processor to execute instructions to select one of a plurality of ring cover candidates as a recommended ring cover candidate by selecting the one of the ring cover candidates having a highest number of loaded network spans, as recited in claim 16.

As noted above, at column 29, lines 55-67, GROVER discloses that the loaded heuristic attempts to pick the best possible set of demand segments in order to make a loaded cycle as appealing as possible to a cycle evaluator. This section of GROVER further discloses that the cycle evaluator chooses the best loaded cycle, and that cycle becomes a ring in the network design. This section of GROVER does not disclose that the best loaded cycle includes having a highest number of loaded network spans. In fact, as noted above, GROVER discloses choosing

a best set of candidate rings based on the ratio of total transport utility (U) to ring construction cost (C) for each candidate ring (abstract), which is simply a different concept from selecting a ring cover candidate having a highest number of loaded network spans. Therefore, this section of GROVER does not disclose or suggest a processor to execute instructions to select one of a plurality of ring cover candidates as a recommended ring cover candidate by selecting the one of the ring cover candidates having a highest number of loaded network spans, as recited in claim 16.

As noted above, at column 32, lines 12-15, GROVER discloses that, once all of the cycles have been evaluated, the best cycle found is committed as a ring in the design in the Commit Ring module, which updates the persistent route data structure and also the span2Route data structure. This section of GROVER does not disclose selecting a ring cover candidate based on a number of loaded network spans. In fact, this section of GROVER does not disclose loaded network spans at all. Therefore, this section of GROVER does not disclose or suggest a processor to execute instructions to select one of a plurality of ring cover candidates as a recommended ring cover candidate by selecting the one of the ring cover candidates having a highest number of loaded network spans, as recited in claim 16.

As noted above, at column 32, lines 35-39, GROVER discloses that the getRoutes function creates a list of routes for a cycle being loaded by obtaining a list of spans comprising the cycle and then, for each cycle span, obtaining from the route list the set of routes crossing the span. This section of GROVER discloses <u>creating a list of routes</u> for a cycle being loaded and does not disclose or suggest <u>selecting a ring cover candidate</u>. Therefore, this section of GROVER does not disclose or suggest a processor to execute instructions to select one of a

plurality of ring cover candidates as a recommended ring cover candidate by selecting the one of the ring cover candidates having a highest number of loaded network spans, as recited in claim 16.

Further with respect to claim 16, the Examiner alleges that GROVER discloses "determining the number of loaded spans covered by the ring candidate...Grover goes on to further suggest that the more demand routes a ring candidate can carry, the better utilized and hence more efficient the resulting ring candidate will be...Thus in determining the best ring candidate to select, Grover suggests the system should consider choosing the ring candidate with the highest number of demand routes" (final Office Action, pg. 16). Appellants submit that the Examiner's allegation regarding GROVER is inconsistent with the disclosure of GROVER.

As noted above, GROVER discloses that the more of the `well-suited` demand routes a ring candidate can carry, the better utilized and hence more efficient the resulting ring candidate will be (column 10, lines 24-38). GROVER further discloses choosing a best set of candidate rings based on the ratio of total transport utility (U) to ring construction cost (C) for each candidate ring (abstract). GROVER in no way discloses or suggests that a ring candidate with the highest number of demand routes is the same as the ring cover candidate having a highest number of loaded network spans. Furthermore, even if a ring candidate with the highest number of demand routes could reasonably be construed as corresponding to the ring cover candidate having a highest number of loaded network spans (a point with Appellants do not agree), GROVER does not disclose or suggest a processor to execute instructions to select one of a plurality of ring cover candidates as a recommended ring cover candidate by selecting the one of the ring cover candidates having a highest number of demand routes, as would be required by

GROVER based on the Examiner's interpretation of claim 16. Rather, GROVER specifically discloses choosing candidate rings based on <u>the ratio of total transport utility (U) to ring construction cost (C) for each candidate ring</u>. Therefore, GROVER does not disclose or suggest a processor to execute instructions to select one of a plurality of ring cover candidates as a recommended ring cover candidate by selecting the one of the ring cover candidates having a highest number of loaded network spans, as recited in claim 16.

For at least the foregoing reasons, Appellants submit that the rejection of claims 16 under 103(a) based on GARDNER and GROVER is improper. As such, Appellants respectfully request that the rejection of claim 16 be reversed.

Claims 19 and 22 depend from claim 16. As such, Appellants request that the rejection of these claims be reversed for at least the reasons given above with respect to claim 16.

3. <u>Claim 23</u>

Independent claim 23 recites a system that includes means for receiving network configuration information and information representing predicted traffic demand for a network; means for generating a plurality of ring cover candidates using a different process to generate each of the ring cover candidates, based on the network configuration information and the information representing predicted traffic demand, each of the ring cover candidates including a plurality of rings, and each of the rings including a plurality of network spans; means for counting, for each ring cover candidate of the plurality of ring cover candidates, a number of loaded network spans covered by the ring cover candidate; and means for selecting one of the ring cover candidates as a recommended ring cover candidate, the recommended ring cover candidate having a highest number of loaded network spans. GARDNER and GROVER,

whether taken alone or in any reasonable combination, do not disclose or suggest one or more of these features.

For example, GARDNER and GROVER do not disclose or suggest means for selecting one of a plurality of ring cover candidates as a recommended ring cover candidate, the recommended ring cover candidate having a highest number of loaded network spans, as recited in claim 23. The Examiner admits that GARDNER does not disclose this feature and relies on the abstract; column 10, lines 24-38; column 29, lines 37-38 and 51-59; and column 32, lines 12-15 and 35-39 of GROVER as allegedly disclosing this feature of claim 16 (final Office Action, pp. 3-4). Appellants submit that neither these sections, nor any other sections, of GROVER disclose or suggest the above feature of claim 23. As such, a *prima facie* case of obviousness has not been established with regard to claim 23.

As noted above, in the abstract, GROVER discloses choosing a best set of candidate rings based on the ratio of total transport utility (U) to ring construction cost (C) for each candidate ring. This section of GROVER does not disclose means for selecting a ring cover candidate based on a number of loaded network spans. In fact, this section of GROVER does not disclose loaded network spans at all. Therefore, this section of GROVER does not disclose or suggest means for selecting one of a plurality of ring cover candidates as a recommended ring cover candidate, the recommended ring cover candidate having a highest number of loaded network spans, as recited in claim 23.

As noted above, at column 10, lines 24-38, GROVER discloses that the more of the `well-suited` demand routes a ring candidate can carry, the better utilized and hence more efficient the resulting ring candidate will be. This section of GROVER further discloses that the

longer a large demand route is carried on a cycle, the better suited the demand route is for inclusion in the ring candidate formed from the cycle being loaded. This section of GROVER does not disclose means for selecting a ring cover candidate based on a number of loaded network spans. Rather, this section of GROVER discloses selecting a demand route for inclusion in the ring candidate. Therefore, this section of GROVER does not disclose or suggest means for selecting one of a plurality of ring cover candidates as a recommended ring cover candidate, the recommended ring cover candidate having a highest number of loaded network spans, as recited in claim 23.

As noted above, at column 29, lines 34-38, GROVER discloses that cycle related statistics include transition count, balance transition count, add/drop count, links on count, and ADM count and that span-related statistics include remaining bandwidth, links on count, and route count. This section of GROVER has nothing to do with means for selecting a ring cover candidate. Rather, this section of GROVER merely outlines statistics related to cycles and spans. Therefore, this section of GROVER does not disclose or suggest means for selecting one of a plurality of ring cover candidates as a recommended ring cover candidate, the recommended ring cover candidate having a highest number of loaded network spans, as recited in claim 23.

As noted above, at column 29, lines 55-67, GROVER discloses that the loaded heuristic attempts to pick the best possible set of demand segments in order to make a loaded cycle as appealing as possible to a cycle evaluator. This section of GROVER further discloses that the cycle evaluator chooses the best loaded cycle, and that cycle becomes a ring in the network design. This section of GROVER does not disclose that the best loaded cycle includes having a highest number of loaded network spans. In fact, as noted above, GROVER discloses choosing

a best set of candidate rings based on the ratio of total transport utility (U) to ring construction cost (C) for each candidate ring (abstract). Therefore, this section of GROVER does not disclose or suggest means for selecting one of a plurality of ring cover candidates as a recommended ring cover candidate, the recommended ring cover candidate having a highest number of loaded network spans, as recited in claim 23.

As noted above, at column 32, lines 12-15, GROVER discloses that, once all of the cycles have been evaluated, the best cycle found is committed as a ring in the design in the Commit Ring module, which updates the persistent route data structure and also the span2Route data structure. This section of GROVER does not disclose means for selecting a ring cover candidate based on a number of loaded network spans. In fact, this section of GROVER does not disclose loaded network spans at all. Therefore, this section of GROVER does not disclose or suggest means for selecting one of a plurality of ring cover candidates as a recommended ring cover candidate, the recommended ring cover candidate having a highest number of loaded network spans, as recited in claim 23.

As noted above, at column 32, lines 35-39, GROVER discloses that the getRoutes function creates a list of routes for a cycle being loaded by obtaining a list of spans comprising the cycle and then, for each cycle span, obtaining from the route list the set of routes crossing the span. This section of GROVER discloses <u>creating a list of routes</u> for a cycle being loaded and does not disclose or suggest means for <u>selecting a ring cover candidate</u>. Therefore, this section of GROVER does not disclose or suggest means for selecting one of a plurality of ring cover candidates as a recommended ring cover candidate, the recommended ring cover candidate having a highest number of loaded network spans, as recited in claim 23.

Further with respect to claim 23, the Examiner alleges that GROVER discloses "determining the number of loaded spans covered by the ring candidate…Grover goes on to further suggest that the more demand routes a ring candidate can carry, the better utilized and hence more efficient the resulting ring candidate will be…Thus in determining the best ring candidate to select, Grover suggests the system should consider choosing the ring candidate with the highest number of demand routes" (final Office Action, pg. 16). Appellants submit that the Examiner's allegation regarding GROVER is inconsistent with the disclosure of GROVER.

As noted above, GROVER discloses that the more of the `well-suited` demand routes a ring candidate can carry, the better utilized and hence more efficient the resulting ring candidate will be (column 10, lines 24-38). GROVER further discloses choosing a best set of candidate rings based on the ratio of total transport utility (U) to ring construction cost (C) for each candidate ring (abstract). GROVER in no way discloses or suggests that a ring candidate with the highest number of demand routes is the same as the ring cover candidate having a highest number of loaded network spans. Furthermore, even if a ring candidate with the highest number of demand routes could reasonably be construed as corresponding to the ring cover candidate having a highest number of loaded network spans (a point with Appellants do not agree), GROVER does not disclose or suggest means for selecting one of a plurality of ring cover candidates as a recommended ring cover candidate by selecting the one of the ring cover candidates having a highest number of demand routes, as would be required by GROVER based on the Examiner's interpretation of claim 23. Rather, GROVER specifically discloses choosing candidate rings based on <u>the ratio of total transport utility (U) to ring construction cost (C) for each candidate ring</u>. Therefore, GROVER does not disclose or suggest means for selecting one

of a plurality of ring cover candidates as a recommended ring cover candidate, the recommended ring cover candidate having a highest number of loaded network spans, as recited in claim 23.

For at least the foregoing reasons, Appellants submit that the rejection of claims 23 under 103(a) based on GARDNER and GROVER is improper. As such, Appellants respectfully request that the rejection of claim 23 be reversed.

4. Claim 24

Independent claim 24 recites a hardware memory device having recorded thereon instructions for at least one processor, the instructions comprising instructions for the at least one processor to perform a method. The method comprises generating a plurality of ring cover candidates for a network by using a different procedure to select a respective plurality of rings for each of the ring cover candidates, the generation of the ring cover candidates being based on configuration information and information representing predicted traffic demand associated with the network, each of the rings including a plurality of network spans; counting, for each ring cover candidate of the plurality of ring cover candidates, a number of loaded network spans covered by the ring cover candidate; and selecting one of the ring cover candidates as a recommended ring cover candidate, the recommended ring cover candidate having a highest number of loaded network spans. GARDNER and GROVER, whether taken alone or in any reasonable combination, do not disclose or suggest one or more of these features.

For example, GARDNER and GROVER do not disclose or suggest selecting one of a plurality of ring cover candidates as a recommended ring cover candidate, the recommended ring cover candidate having a highest number of loaded network spans, as recited in claim 24. The Examiner admits that GARDNER does not disclose this feature and relies on the abstract;

column 10, lines 24-38; column 29, lines 37-38 and 51-59; and column 32, lines 12-15 and 35-39 of GROVER as allegedly disclosing this feature of claim 16 (final Office Action, pp. 3-4). Appellants submit that neither these sections, nor any other sections, of GROVER disclose or suggest the above feature of claim 24. As such, a *prima facie* case of obviousness has not been established with regard to claim 24.

As noted above, in the abstract, GROVER discloses choosing a best set of candidate rings based on the ratio of total transport utility (U) to ring construction cost (C) for each candidate ring. This section of GROVER does not disclose selecting for ring cover candidate based on a <u>number of loaded network spans</u>. In fact, this section of GROVER does not disclose loaded network spans at all. Therefore, this section of GROVER does not disclose or suggest selecting one of a plurality of ring cover candidates as a recommended ring cover candidate, the recommended ring cover candidate having a highest number of loaded network spans, as recited in claim 24.

As noted above, at column 10, lines 24-38, GROVER discloses that the more of the `well-suited` demand routes a ring candidate can carry, the better utilized and hence more efficient the resulting ring candidate will be. This section of GROVER further discloses that the longer a large demand route is carried on a cycle, the better suited the demand route is for inclusion in the ring candidate formed from the cycle being loaded. This section of GROVER does not disclose <u>selecting a ring cover candidate</u> based on a number of loaded network spans. Rather, this section of GROVER discloses <u>selecting a demand route</u> for inclusion in the ring candidate. Therefore, this section of GROVER does not disclose or suggest selecting one of a plurality of ring cover candidates as a recommended ring cover candidate, the recommended ring

cover candidate having a highest number of loaded network spans, as recited in claim 24.

As noted above, at column 29, lines 34-38, GROVER discloses that cycle related statistics include transition count, balance transition count, add/drop count, links on count, and ADM count and that span-related statistics include remaining bandwidth, links on count, and route count. This section of GROVER has nothing to do with selecting a ring cover candidate. Rather, this section of GROVER merely outlines statistics related to cycles and spans. Therefore, this section of GROVER does not disclose or suggest selecting one of a plurality of ring cover candidates as a recommended ring cover candidate, the recommended ring cover candidate having a highest number of loaded network spans, as recited in claim 24.

As noted above, at column 29, lines 55-67, GROVER discloses that the loaded heuristic attempts to pick the best possible set of demand segments in order to make a loaded cycle as appealing as possible to a cycle evaluator. This section of GROVER further discloses that the cycle evaluator chooses the best loaded cycle, and that cycle becomes a ring in the network design. This section of GROVER does not disclose that the best loaded cycle includes having a <u>highest number of loaded network spans</u>. In fact, as noted above, GROVER discloses choosing a best set of candidate rings based on the ratio of total transport utility (U) to ring construction cost (C) for each candidate ring (abstract). Therefore, this section of GROVER does not disclose or suggest selecting one of a plurality of ring cover candidates as a recommended ring cover candidate, the recommended ring cover candidate having a highest number of loaded network spans, as recited in claim 24.

As noted above, at column 32, lines 12-15, GROVER discloses that, once all of the cycles have been evaluated, the best cycle found is committed as a ring in the design in the

Commit Ring module, which updates the persistent route data structure and also the span2Route data structure. This section of GROVER does not disclose selecting a ring cover candidate based on a number of loaded network spans. In fact, this section of GROVER does not disclose loaded network spans at all. Therefore, this section of GROVER does not disclose or suggest selecting one of a plurality of ring cover candidates as a recommended ring cover candidate, the recommended ring cover candidate having a highest number of loaded network spans, as recited in claim 24.

As noted above, at column 32, lines 35-39, GROVER discloses that the getRoutes function creates a list of routes for a cycle being loaded by obtaining a list of spans comprising the cycle and then, for each cycle span, obtaining from the route list the set of routes crossing the span. This section of GROVER discloses <u>creating a list of routes</u> for a cycle being loaded and does not disclose or suggest <u>selecting a ring cover candidate</u>. Therefore, this section of GROVER does not disclose or suggest selecting one of a plurality of ring cover candidates as a recommended ring cover candidate, the recommended ring cover candidate having a highest number of loaded network spans, as recited in claim 24.

Further with respect to claim 24, the Examiner alleges that GROVER discloses "determining the number of loaded spans covered by the ring candidate...Grover goes on to further suggest that the more demand routes a ring candidate can carry, the better utilized and hence more efficient the resulting ring candidate will be...Thus in determining the best ring candidate to select, Grover suggests the system should consider choosing the ring candidate with the highest number of demand routes" (final Office Action, pg. 16). Appellants submit that the Examiner's allegation regarding GROVER is inconsistent with the disclosure of GROVER.

As noted above, GROVER discloses that the more of the `well-suited` demand routes a ring candidate can carry, the better utilized and hence more efficient the resulting ring candidate will be (column 10, lines 24-38). GROVER further discloses choosing a best set of candidate rings based on the ratio of total transport utility (U) to ring construction cost (C) for each candidate ring (abstract). GROVER in no way discloses or suggests that a ring candidate with the highest number of demand routes is the same as the ring cover candidate having a highest number of loaded network spans. Furthermore, even if a ring candidate with the highest number of demand routes could reasonably be construed as corresponding to the ring cover candidate having a highest number of loaded network spans (a point with Appellants do not agree), GROVER does not disclose or suggest selecting one of a plurality of ring cover candidates as a recommended ring cover candidate, the recommended ring cover candidate having a highest number of demand routes, as would be required by GROVER based on the Examiner's interpretation of claim 24. Rather, GROVER specifically discloses choosing candidate rings based on <u>the ratio of total transport utility (U) to ring construction cost (C) for each candidate ring</u>. Therefore, GROVER does not disclose or suggest selecting one of a plurality of ring cover candidates as a recommended ring cover candidate, the recommended ring cover candidate having a highest number of loaded network spans, as recited in claim 24.

For at least the foregoing reasons, Appellants submit that the rejection of claims 24 under 103(a) based on GARDNER and GROVER is improper. As such, Appellants respectfully request that the rejection of claim 24 be reversed.

5. <u>Claim 25</u>

Claim 25 depends from claim 24. Therefore, Appellants respectfully request that the

rejection of claim 25 be reversed for at least the reasons given above with respect to claim 24. Moreover, claim 25 recites additional features not disclosed or suggested by GARDNER and GROVER.

For example, claim 25 recites creating a spanning tree based on loaded ones of the network spans, generating a plurality of fundamental rings based on the spanning tree, and generating a plurality of rings based on the generated fundamental rings. The Examiner relies on page 1, column 2, lines 32-43 and page 3, column 2, lines 2-5 and 13-15 of GARDNER as allegedly disclosing these features of claim 25 (final Office Action, pp. 5-6). Appellants submit that neither these sections, nor any other sections, of GARDNER disclose or suggest the above features of claim 25. As such, a *prima facie* case of obviousness has not been established with regard to claim 25.

At page 1, column 2, lines 32-43, GARDNER discloses forming a depth first spanning tree by performing a depth first search starting from a specified node and proceeding through all links of a network. This section of GARDNER does not disclose or suggest creating a spanning tree based on <u>loaded ones of network spans</u>. Rather, this section of GARDNER discloses forming a spanning tree based on a depth first search. Appellants submit that these are simply two different ways of creating spanning trees. Therefore, this section of GARDNER does not disclose or suggest creating a spanning tree based on loaded ones of the network spans, generating a plurality of fundamental rings based on the spanning tree, and generating a plurality of rings based on the generated fundamental rings, as recited in claim 25.

At page 3, column 2, lines 2-5, GARDNER discloses that, for a network N whose nodes can be covered by two edge disjointed spanning trees, one can always guarantee an appropriate

decomposition of an Eulerian cycle. This section of GARDNER has nothing to do with generating a plurality of rings based on the generated fundamental rings. Therefore, this section of GARDNER does not disclose or suggest creating a spanning tree based on loaded ones of the network spans, generating a plurality of fundamental rings based on the spanning tree, and generating a plurality of rings based on the generated fundamental rings, as recited in claim 25.

At page 3, column 2, lines 13-15, GARDNER discloses that the MSRC problem can be solved in $O(n^3 \log n)$ time, for networks N whose nodes can be covered by two edge disjoint spanning trees. This section of GARDNER has nothing to do with generating a plurality of rings based on generated fundamental rings. Therefore, this section of GARDNER does not disclose or suggest creating a spanning tree based on loaded ones of the network spans, generating a plurality of fundamental rings based on the spanning tree, and generating a plurality of rings based on the generated fundamental rings, as recited in claim 25.

The disclosure of GROVER does not remedy the deficiencies in the disclosure of GARDNER set forth above.

For at least the foregoing reasons, Appellants submit that the rejection of claims 25 under 103(a) based on GARDNER and GROVER is improper. As such, Appellants respectfully request that the rejection of claim 25 be reversed.

B. The rejection under 35 U.S.C. § 103(a) based on GARDNER, GROVER, and CHOW should be reversed.

1. Claims 2, 9, and 10

Claim 2 depends from claim 1. Without acquiescing in the Examiner's rejection of claim 1, Appellants submit that the disclosure of CHOW does not remedy the deficiencies in the

disclosures of GARDNER and GROVER set forth above with respect to claim 1. As such, Appellants respectfully request that the rejection of claim 2 be reversed for at least the reasons given above with respect to claim 1.

Claims 9 and 10 depend from claim 2. As such, Appellants respectfully request that the rejection of claims 9 and 10 be reversed for at least the reasons given above with respect to claim 2.

2. Claim 11

Claim 11 depends from claim 2. As such, Appellants respectfully request that the rejection of claim 11 be reversed for at least the reasons given above with respect to claim 2. Moreover, claim 11 recites an additional feature not disclosed or suggested by GARDNER, GROVER, and CHOW.

For example, claim 11 recites that the at least one report includes information about network spans not covered by any valid ones of the rings of the ring cover candidate. The Examiner admits that GARDNER and GROVER do not disclose this feature and relies on column 3, lines 7-11; column 6, lines 48-55; and column 13, lines 56-60 of CHOW as allegedly disclosing this feature of claim 11 (final Office Action, pg. 8). Appellants submit that neither these sections, nor any other sections, of CHOW disclose or suggest the above feature of claim 11. As such, a *prima facie* case of obviousness has not been established with regard to claim 11.

At column 3, lines 7-11, CHOW discloses that a designed bi-connected ring-based network is either stored or outputted as a report. However, this section of CHOW does not disclose that the report includes information about network spans not covered by any valid ones of the rings of the ring cover candidate, as recited in claim 11. Therefore, this section of CHOW

cannot be reasonably relied upon for disclosing or suggesting the above feature of claim 11.

At column 6, lines 48-55, CHOW discloses:

> After the data describing the network to be designed is received, a dual-homed cover is determined 140, the cover includes one or more cycles/rings, where each location capable of being bi-connected, is included in at least one of the dual-homed cycles. After the cycles are selected the traffic demand is routed 150 over the one or more cycles. A report including a representation of the designed ring-based network is then outputted or stored 160.

This section of CHOW discloses that a representation of a designed ring-based network is outputted or stored. This section of CHOW does not disclose that the representation includes <u>information about network spans not covered by any valid ones of the rings of the ring cover candidate</u>. Therefore, this section of CHOW does not disclose that the report includes information about network spans not covered by any valid ones of the rings of the ring cover candidate, as recited in claim 11.

At column 13, lines 56-60, CHOW discloses that, after the network traffic has been assigned and the necessary network traffic management equipment has been placed, the results are stored or supplied in the form of a report, which outlines the network design. This section of CHOW does not disclose that the report includes information about network spans not covered by any valid ones of the rings of the ring cover candidate, as recited in claim 11. Rather, as noted above, CHOW merely discloses that the report outlines the network design.

For at least the foregoing reasons, Appellants submit that rejection of claims 1 under 103(a) based on GARDNER, GROVER, and CHOW is improper. As such, Appellants respectfully request that the rejection of claim 11 be reversed.

3. <u>Claim 12</u>

Claim 12 depends from claim 2. As such, Appellants respectfully request that the

rejection of claim 12 be reversed for at least the reasons given above with respect to claim 2. Moreover, claim 12 recites an additional feature not disclosed or suggested by GARDNER, GROVER, and CHOW.

For example, claim 12 recites that the at least one report includes information about network spans not covered by any ones of the rings of the ring cover candidate. The Examiner admits that GARDNER and GROVER do not disclose this feature and relies on column 3, lines 7-11; column 6, lines 48-55; and column 13, lines 56-60 of CHOW as allegedly disclosing this feature of claim 11 (final Office Action, pg. 8). Appellants submit that neither these sections, nor any other sections, of CHOW disclose or suggest the above feature of claim 12. As such, a *prima facie* case of obviousness has not been established with regard to claim 12.

As noted above, at column 3, lines 7-11, CHOW discloses that a designed bi-connected ring-based network is either stored or outputted as a report. However, this section of CHOW does not disclose that the report includes information about network spans not covered by any ones of the rings of the ring cover candidate, as recited in claim 12.

As noted above, at column 6, lines 48-55, CHOW discloses that a representation of a designed ring-based network is outputted or stored. This section of CHOW does not disclose that the representation includes <u>information about network spans not covered by any ones of the rings of the ring cover candidate</u>. Therefore, this section of CHOW does not disclose that the report includes information about network spans not covered by any ones of the rings of the ring cover candidate, as recited in claim 12.

At column 13, lines 56-60, CHOW discloses that, after the network traffic has been assigned and the necessary network traffic management equipment has been placed, the results

are stored or supplied in the form of a report, which outlines the network design. This section of CHOW does not disclose that the report includes information about network spans not covered by any ones of the rings of the ring cover candidate, as recited in claim 12. Rather, as noted above, CHOW merely discloses that the report outlines the network design.

For at least the foregoing reasons, Appellants submit that rejection of claims 1 under 103(a) based on GARDNER, GROVER, and CHOW is improper. As such, Appellants respectfully request that the rejection of claim 12 be reversed.

4. Claim 13

Claim 13 depends from claim 2. As such, Appellants respectfully request that the rejection of claim 13 be reversed for at least the reasons given above with respect to claim 2.

C. The rejection under 35 U.S.C. § 103(a) based on GARDNER, GROVER, and KENNINGTON should be reversed.

1. Claims 4-7

Claim 4 depends from claim 3. Without acquiescing in the Examiner's rejection of claim 4, Appellants submit that the disclosure of KENNINGTON does not remedy the deficiencies in the disclosures of GARDNER and GROVER set forth above with respect to claim 3. As such, Appellants respectfully request that the rejection of claim 4 be reversed for at least the reasons given above with respect to claim 3.

Claims 5-7 depend from claim 4. As such, Appellants respectfully request that the rejection of claims 5-7 be reversed for at least the reasons given above with respect to claim 4.

2. Claim 8

Claim 8 depends from claim 1. Without acquiescing in the Examiner's rejection of claim

8, Appellants submit that the disclosure of KENNINGTON does not remedy the deficiencies in the disclosures of GARDNER and GROVER set forth above with respect to claim 1. As such, Appellants respectfully request that the rejection of claim 8 be reversed for at least the reasons given above with respect to claim 1.

3. Claim 18

Claim 18 depends from claim 16. Without acquiescing in the Examiner's rejection of claim 18, Appellants submit that the disclosure of KENNINGTON does not remedy the deficiencies in the disclosures of GARDNER and GROVER set forth above with respect to claim 16. As such, Appellants respectfully request that the rejection of claim 18 be reversed for at least the reasons given above with respect to claim 16.

4. Claim 21

Claim 21 depends from claim 16. Without acquiescing in the Examiner's rejection of claim 21, Appellants submit that the disclosure of KENNINGTON does not remedy the deficiencies in the disclosures of GARDNER and GROVER set forth above with respect to claim 16. As such, Appellants respectfully request that the rejection of claim 21 be reversed for at least the reasons given above with respect to claim 16.

5. Claims 26-28

Claims 26-28 depends from claim 25. Without acquiescing in the Examiner's rejection of claims 26-28, Appellants submit that the disclosure of KENNINGTON does not remedy the deficiencies in the disclosures of GARDNER and GROVER set forth above with respect to claim 25. As such, Appellants respectfully request that the rejection of claims 26-28 be reversed for at least the reasons given above with respect to claim 25.

VIII. CONCLUSION

In view of the foregoing arguments, Appellants respectfully solicit the Honorable Board to reverse the Examiner's rejections of claims 1-13, 16-19, and 21-30 under 35 U.S.C. § 103.

To the extent necessary, a petition for an extension of time under 37 C.F.R. § 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account No. 50-1070 and please credit any excess fees to such deposit account.

Respectfully submitted,

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IX. CLAIM APPENDIX

1. A processor-implemented method comprising:

receiving, at the processor, network configuration information and traffic demand information for a network;

generating, by the processor, a plurality of ring cover candidates, each ring cover candidate including a plurality of rings, based on the network configuration information and the traffic demand information, each of the rings including a plurality of network spans, where the generating the ring cover candidate includes generating the plurality of ring cover candidates by using a different process to generate each of the ring cover candidates;

counting, for each ring cover candidate of the plurality of ring cover candidates, a number of loaded network spans covered by the ring cover candidate; and

selecting one of the plurality of ring cover candidates as a recommended ring cover candidate by selecting the one of the ring cover candidates having a highest number of loaded network spans.

2. The processor-implemented method of claim 1, further comprising

generating and outputting at least one report describing characteristics of the ring cover candidate.

3. The processor-implemented method of claim 1, where the generating the ring cover candidate comprises creating a spanning tree from a plurality of loaded network spans of the network.

4. The processor-implemented method of claim 3, where the generating the ring cover candidate further comprises:

adding one or more chords to the spanning tree to create a plurality of first rings;

generating a plurality of second rings by combining two of the plurality of first rings; and

generating a plurality of third rings by combining one of the second rings with one of the first rings.

5. The processor-implemented method of claim 4, where the generating a plurality of third rings comprises generating derived third degree rings and focused third degree rings.

6. The processor-implemented method of claim 4, where at least some of the third rings and the second rings are based on an invalid first ring.

7. The processor-implemented method of claim 4, further comprising storing information regarding the first rings, the second rings and the third rings in span-linked lists associated with respective ones of a plurality of network spans covered by the first rings, the second rings and the third rings.

8. The processor-implemented method of claim 1, the generating the plurality of ring cover candidates comprising:

generating a first ring cover candidate by using cheapest ones of the rings formed on loaded network spans,

generating a second ring cover candidate by using cheapest ones of the rings formed on a maximum number of uncovered network spans, and

generating a third ring cover candidate by using cheapest ones of the rings from the first ring cover candidate.

9. The processor-implemented method of claim 2, where the at least one report includes characteristics of each of the rings included in the ring cover candidate.

10. The processor-implemented method of claim 9, where the characteristics of each of the rings include a ring identifier, a number of nodes covered by a corresponding one of the rings, and a length of the corresponding one of the rings.

11. The processor-implemented method of claim 2, where the at least one report includes information about network spans not covered by any valid ones of the rings of the ring cover candidate.

12. The processor-implemented method of claim 2, where the at least one report includes information about network spans not covered by any ones of the rings of the ring cover candidate.

13. The processor-implemented method of claim 2, where the at least one report provides characteristics of each of the plurality of ring cover candidates.

14. (canceled)

15. (canceled)

16. An apparatus comprising:

at least one storage device to store instructions; and

at least one processor to execute the instructions to:

generate a plurality of ring cover candidates based on configuration information and traffic demand information associated with a network, where the at least one processor generates the plurality of ring cover candidates using a different set of parameters to generate each of the ring cover candidates,

count, for each ring cover candidate of the plurality of ring cover candidates, a number of loaded network spans covered by the ring cover candidate, and

select one of the plurality of ring cover candidates as a recommended ring cover candidate by selecting the one of the ring cover candidates having a highest number of loaded network spans.

17. The apparatus of claim 16, where the at least one processor is to generate a report describing characteristics of the selected one of the ring cover candidates.

18. The apparatus of claim 16, where the at least one processor is to generate a plurality of rings for each of the plurality of ring cover candidates, the plurality of rings including a plurality of fundamental rings, a plurality of second degree rings, and a plurality of third degree rings.

19. The apparatus of claim 16, where the at least one processor is further to store each of the rings of the plurality of ring cover candidates in span linked lists associated with ones of a plurality of network spans of the network covered by the rings in the at least one storage device.

20. (canceled)

21. The apparatus of claim 16, where, when generating the plurality of ring cover candidates, the at least one processor is:

to generate a first ring cover candidate by using shortest ones of the rings formed on loaded network spans,

to generate a second ring cover candidate by using shortest ones of the rings formed on a maximum number of uncovered network spans, and

to generate a third ring cover candidate by using shortest ones of the rings from the first ring cover candidate.

22. The apparatus of claim 16, where the at least one processor is further to rank each

of a plurality of rings included in the plurality of ring cover candidates, the rank being based on a measure of a benefit of including a respective ring in the plurality of ring cover candidates versus a measure of a cost of including the respective ring in the plurality of ring cover candidates.

23. A system comprising:

means for receiving network configuration information and information representing predicted traffic demand for a network;

means for generating a plurality of ring cover candidates using a different process to generate each of the ring cover candidates, based on the network configuration information and the information representing predicted traffic demand, each of the ring cover candidates including a plurality of rings, and each of the rings including a plurality of network spans;

means for counting, for each ring cover candidate of the plurality of ring cover candidates, a number of loaded network spans covered by the ring cover candidate; and

means for selecting one of the ring cover candidates as a recommended ring cover candidate, the recommended ring cover candidate having a highest number of loaded network spans.

24. A hardware memory device having recorded thereon instructions for at least one processor, the instructions comprising instructions for the at least one processor to perform a method, the method comprising:

generating a plurality of ring cover candidates for a network by using a different procedure to select a respective plurality of rings for each of the ring cover candidates, the

generation of the ring cover candidates being based on configuration information and information representing predicted traffic demand associated with the network, each of the rings including a plurality of network spans;

counting, for each ring cover candidate of the plurality of ring cover candidates, a number of loaded network spans covered by the ring cover candidate; and

selecting one of the ring cover candidates as a recommended ring cover candidate, the recommended ring cover candidate having a highest number of loaded network spans.

25. The hardware memory device of claim 24, where the method further comprises:

creating a spanning tree based on loaded ones of the network spans,

generating a plurality of fundamental rings based on the spanning tree, and

generating a plurality of rings based on the generated fundamental rings.

26. The hardware memory device of claim 25, where the plurality of rings generated based on the generated fundamental rings include at least one of second degree rings or third degree rings.

27. The hardware memory device of claim 25, where the method further comprises:

creating a focused third degree ring to cover a network span when the network span is covered only by an invalid fundamental ring.

28. The hardware memory device of claim 25, where:

the plurality of rings generated based on the generated fundamental rings are formed by combining a fundamental ring with another of the rings, and

the fundamental ring and the other of the rings have a network span in common.

29. The hardware memory device of claim 24, where the method further comprises:

calculating a ranking of each of the rings in at least one of the ring cover candidates, the ranking being based on a benefit gained by including a respective ring in the at least one ring cover candidate versus a measure of a cost incurred by including the respective ring in the at least one ring cover candidate.

30. The hardware memory device of claim 24, where the method further comprises:

generating at least one report that describes characteristics of at least one of the ring cover candidates.

X. EVIDENCE APPENDIX

None.

XI. RELATED PROCEEDINGS APPENDIX

None.